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SEX DIFFERENCES IN COMPUTER ORIENTATION BY HOLLAND TYPE

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Research Report # 3-86

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Abstract

Differences in computer attitudes due to sex and Holland type were investigated. Subjects were 289 incoming freshmen at the University of Maryland (44% male; 56% female). The Computer Attitude Scale (Loyd and Gressard, 1984b) was used to assess computer orientation. Females were significantly more anxious, less confident, and lower in computer liking than were males ($p < .01$). Enterprising types were significantly more anxious, less confident, and lower in computer liking than were Realistic or Investigative types ($p < .01$). Artistic types were significantly more anxious than Realistic types and less confident and lower in computer liking than both Realistic and Investigative types ($p < .01$). The significant sex differences are not reflected in previous data on the Computer Attitude Scale but the differences among Holland types are conceptually consistent with predictions of which Holland types would have more positive computer attitudes.

Sex Differences in

Computer Orientation by Holland Type

Exploring student vocational interests has much practical value for student affairs professionals, for these vocational interests can be effectively used to indicate curriculum and program needs (Campbell & Hansen, 1981). It may be particularily important to examine student interests and attitudes toward computers since computers play an increasingly important role in vocational preparation today (Lawton & Gerschner, 1982). Computer literacy has become as necessary to the contemporary student as literacy in reading and writing was to students of previous generations (Ringle, 1981). However, not all students are comfortable with these new demands for computer competence; indeed, many may experience what Jay (1981) describes as "computerphobia." Such students may be fearful or anxious about computers, resistent to talking or thinking about them, and/or hostile and agressive toward computers. Loyd and Gressard (1984a) surmise that such attitudes preclude computer competence. Another group of students exist who have very different attitudes toward computers. "Hackers" are so attracted to computer work that it becomes an obsession, to the exclusion of other work and human relationships (Ingber, 1981). Hackers and computerphobic students are at the extreme ends of a continuum of student computer attitudes, and vocaticnal and student affairs

professionals must be prepared to work with both groups, as well as the many other students who are between those two extremes.

Holland (1979) has developed a system of identifying vocational types which may help in organizing knowledge about student vocationally-related attitudes toward computers. Computer work, in general involves Investigative qualities, although other Holland types can be important in such related occupations as computer technician (Realistic) or Computer Operator (Social, Gottfredson, Holland & Ogawa, 1982). Given their task-oriented nature and preference for abstract problem-solving, it might be predicted that Investigative types would be more positive toward computer work than Artistic types, who have more self-expressive, individualistic needs. A systemmatic exploraton of such differences is necessary in order to make generalizations.

Sex differences in computer attitudes may be a complex but potentially important consideration. Contrary to initial expectations, Loyd and Gressard (1984a) found no differences between male and female attitudes toward computers. However as women become more vocationally oriented, especially toward nontraditional, technical careers, computer competence becomes increasingly important. Martinez, Sedlacek, and Bachhuber (1985) found that recent women college graduates wished they had taken a more practical, career-oriented major. The impact of computers on the market-place has been noted (Loyd & Gressard, 1984a); how many of those women wished they had received more training in

computer-related work? Further, women who had expressed an interest in nontraditional fields (more likely to require extensive computer work) early in their undergraduate careers reported receiving less support in their vocational planning than did women choosing traditional carreers (Boulle-Lauria, Sedlacek & Waldo, 1985).

Given the importance of computer competence in vocational planning and given possible differences in computer attitudes between students depending on their Holland type and their sex, an investigation of these variables was conducted.

Method

A sample of 289 incoming freshmen (44% male; 56% female) at the University of Maryland, College Park completed the Computer Attitude Scale (Loyd & Gressard, 1984b). The Computer Attitude Scale consists of three subscales, each of which represents a specific computer-related attitude significantly affecting student achievement. The Computer Anxiety score reflects fear about computers and/or learning to use them; the Computer Confidence score indicates the degree of self-confidence about computer abilities; and the Computer Liking score represents how well one likes computers and enjoys computer work. Loyd and Gressard (1984b) found alpha coefficients of .87, .91, and .91 for Computer Anxiety, Computer Confidence, and Computer Liking, respectively. The items on each subscale are computer-related

statements worded in positive or negative terms. Students were assigned a one letter Holland code on the basis of their responses to an item which asked them to list, by occupation, their top three vocational goals. Trained recorders coded the occupation as Realistic, Investigative, Artistic, Social, Enterprising, or Conventional. Valid results using this method of assigning Holland codes have been demonstrated (Toenjes & Borgen, 1974; Tonesk, Suziedelis & Lorr, 1974; Wakefield & Doughtie, 1973).

Analysis

Results were analyzed using 2-way multivariate analysis of variance MANOVA (sex and Holland type) on the three computer subscales with Student-Newman Kuels post-hoc tests.

Results

The MANOVA revealed significant main effects for both variables on Computer Anxiety, Computer Confidence, and Computer Liking ($p < .01$). No interaction effects were demonstrated on any of three subscales. Table 1 shows the Holland codes for the

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Insert Table 1 about here

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entire sample, grouped by sex. The absence of any Conventional females is to be noted.

Table 2 shows the means and standard deviations for

Computer Anxiety scores. Females were significantly more anxious

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Insert Table 2 about here

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than males ($F=31.10$, $p < .01$). Holland type was also significant as a main effect ($F=3.69$, $p < .01$). Post hoc tests revealed that Enterprising and Artistic types were significantly more anxious than Realistic types. Enterprising students were also significantly more anxious than Investigative students.

Males were also significantly more computer confident than females ($F=34.37$, $p < .01$) (Table 3). Again, Holland type was also significant ($F=5.64$, $p < .01$). Post hoc procedures showed

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Insert Table 3 about here

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that Realistic students were significantly more confident than Enterprising, Artistic, and Social students. Investigative students were also significantly more confident than Enterprising and Artistic students.

Table 4 shows similar trends for Computer Liking. Again, males indicated a higher liking for computers than did females ($F=19.01$, $p < .01$). Post-hoc testing on the significant main effect of Holland type ($F=4.82$, $p < .01$) revealed that Realistic

Insert Table 4 about here

and Investigative students liked computers more than did Enterprising and Artistic students.

Discussion

Several results appear to have implications for vocational and student affairs professionals. First is the information provided by the Holland coding. Across all dimensions (Computer Anxiety, Computer Confidence, and Computer Liking), Realistic and Investigative students expressed more postive computer attitudes than did Enterprising and Artistic students. Since they like to work with mechanical equipment and function better with things than with people or ideas, the technical aspects of computer work are likely very appealing to Realistic types. Investigative students also had positive computer attitudes, but possibly for different reasons than did Realistic students. Programming aspects of computer work would probably be very appealing to Investigative types because of the abstract, problem-solving nature of the tasks involved.

Perhaps more imporant to consider are the possible reasons why Artistic and Enterprising students did not have positive attitudes toward computers. As mentioned above, the self expressive, individualistic nature of Artistic students'

vocational interests is not clearly compatible with computer-related tasks, and Artistic students may not see computer competence as relevant to their career goals. However, computers are becoming important in many Artistic occupations, and students interested in those occupations must be prepared. In the theatre, for example, computers are being used in set design as well as in lighting (Klepper, 1984). In the art room, computers are used in interactive video roles, for printing techniques, and to create graphics (Snyder, 1985). One group for which computer skills are obviously not irrelevant but who demonstrated less than positive computer attitudes was the Enterprising group of students. In Enterprising occupations such as sales manager, stock broker, public relations manager, and account executive, computers provide important functions, yet without positive attitudes toward computer work Enterprising students could have a more difficult time dealing with their job responsibilities. Much of the strength of Enterprising types lies in their energy, leadership, and persuasatory skills; these are among the most important qualifications they bring to their jobs. However, specific skills that are required, such as competence in computer tasks, are not necessarily avoidable.

Vocational counselors should be aware of this possibility of computer anxiety and lack of computer confidence and liking when working with Enterprising students. Further, workshops conducted through a joint effort of the business department (where many

Enterprising students are enrolled), the campus computer science center, and the campus vocational counselors could be used to inform these students early about the importance of computer competence in their career goals. This could give them experience in simulated Enterprising-relevant tasks (making the skills more meaningful for them), and provide them with opportunities for more extensive computer classes. Given that Loyd and Gressard (1984a) found that computer experience was positively related to better computer attitudes, such workshops could help to increase positive attitudes toward computers of Enterprising students.

Sex differences between male and female computer attitudes is interesting, especially in light of Loyd and Gressard's finding indicating no sex differences on the same computer attitudes (1984a). Given the three components of computer attitudes--Computer Anxiety, Computer Confidence, and Computer Liking--the present results do not necessarily mean that female students are less interested in computers than men. True, they did not indicate a great deal of liking for computers, but this could easily relate to their high anxiety and lack of confidence. The anxiety and the confidence problems must be overcome before the degree of liking will change, and again, Loyd and Gressard's (1984a) discussion of the importance of computer experience is relevant here. Instructors in particular academic curricula can be sensitive to possible computer-related problems of their

female students (especially those in Enterprising and Artistic fields, as discussed previously). Campus women's center groups might work with career counselors and computer science center professionals on workshops such as the sort recommended for Enterprising students, with particular emphasis on learning computer skills in a nonthreatening environment.

The importance of computer skills for those entering the job market cannot be ignored, and the present results identify groups of students who may particularily benefit from extra computer-related attention from vocational and student affairs professionals. The results are conceptually consistent with informal observations regarding which students would be likely to have more positive computer attitudes. Given what we know about Holland types (Campbell & Hansen, 1981) it is not surprising that Investigative and Realistic students indicated more positive computer attitudes than did Artistic students. However, logical assumptions and informal observations need to be investigated empirically, as done in the present study. Sometimes results can be surprising. A case in point is the lack of sex differences in computer attitudes found by Loyd and Gressard (1984a). Results of the current study strongly indicate significant differences, and given these conflicting findings, replications are needed to determine whether sex differences exist in other settings. By being better attuned to student computer attitudes and problems, vocational and student affairs professionals can better help

students in successful vocational planning.

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Table 1

Holland Types by Sex

Holland Type	Male	Female
Realistic	40%	20%
Investigative	30%	28%
Artistic	7%	14%
Social	4%	11%
Enterprising	18%	27%
Conventional	1%	0%
Total	100%	100%

Table 2

Means and Standard Deviations of Computer Anxiety Scores by Holland Type and Sex

	Sex			
	Male		Female	
Holland Type	M	SD	M	SD
Realistic	4.08	.65	3.65	.61
Investigative	4.10	.66	3.48	.85
Artistic	3.29	.55	3.42	.63
Social	4.00	.61	3.41	.89
Enterprising	3.51	.1>79	3.27	.73
Conventional	3.50	.00	-	-

Note:

1. Both Sex and Holland Type were significant ($p < .01$).
2. A higher score indicates less anxiety.
3. Post hoc tests revealed Enterprising and Artistic types significantly more anxious ($p < .01$) than Realistic types. Enterprising students were also significantly more anxious ($p < .01$) than Investigative types.
4. There were no Conventional female students in this sample.

Table 3

Means and Standard Deviations of Computer Confidence Scores by Holland Type and Sex

	Sex			
	Male		Female	
Holland Type	M	SD	M	SD
Realistic	4.03	.66	3.54	.56
Investigative	3.97	.64	3.45	.69
Artistic	3.19	.53	3.23	.69
Social	3.86	.53	3.27	.69
Enterprising	3.33	.89	3.14	.79
Conventional	3.60	.00	-	-

Note:

1. Both Holland Type and Sex were significant ($p < .01$).
2. A higher score indicates more computer confidence.
3. Post hoc tests indicated that Realistic students were signficantly ($p < .01$) more confident than Enterprsing, Artistic, and Social students. Investigative students were also significantly more confident ($p < .01$) than Enterprising and Artistic students.
4. There were no Conventional females in this sample.

Table 4

Means and Standard Deviations of Computer Liking Score by Holland Type and Sex

	Sex			
	Male		Female	
Holland Type	M	SD	M	SD
Realistic	3.66	.78	3.24	.66
Investigative	3.81	.64	3.24	.83
Artistic	2.53	.53	3.00	.71
Social	3.64	.70	3.03	.83
Enterprising	3.03	.93	3.00	.76
Conventional	3.70	.00	-	-

Note:

1. Both Sex and Holland Type were significant ($p < .01$).
2. A higher score indicates more computer liking.
3. Post hoc tests revealed the Realistic and Investiative students liked computers more than did Enterprising and Artistic students.
4. There were no Conventional females in this sample.